UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/623,018	10/30/2000	Jyrki Hiltunen	365-460P	5476

2292 7590 01/30/2004

BIRCH STEWART KOLASCH & BIRCH
PO BOX 747
FALLS CHURCH, VA 22040-0747

EXAMINER	
LEUNG, JENNIFER A	

ART UNIT	PAPER NUMBER
1764	

DATE MAILED: 01/30/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/623,018	HILTUNEN ET AL.	
	Examiner	Art Unit	
	Jennifer A. Leung	1764	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 November 2003*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8,13-17 and 21* is/are rejected.

7)☒ Claim(s) *9-12 and 18-20* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Response to Amendment

1. Applicant's amendment submitted on November 3, 2003 has been received and carefully considered. The changes made to the abstract and drawings are acceptable. The changes made to the specification are not acceptable. Claim 21 has been added. Claims 1-21 remain active.

Terminal Disclaimer

2. The terminal disclaimer filed on November 3, 2003 disclaiming the terminal portion of any patent granted on this application extending beyond the expiration date of U.S. Patent No. 6,045,688 has been reviewed and is accepted. The terminal disclaimer has been recorded.

Priority

3. Applicant has not complied with one or more conditions for receiving the benefit of an earlier filing date under 35 U.S.C. 120 because copendency between the current application and the prior filed nonprovisional application is required. The prior filed nonprovisional application 08/921,384 received a patent on April 4, 2000, whereas the current application was filed on October 30, 2000 -- nearly 7 months after the termination of proceedings in the prior application.

Specification

4. The attempt to convert the instant application into a "Continuation-in-Part" application of U.S. Application No. 09/921,384 (USPN 6,045,688) by cross-reference on page 1, lines 3-5, of the substitute specification is improper because the priority requirements have not been met.

Claim Objections

5. Claim 1 is objected to because "is fed" in line 3 should be deleted, for proper grammatical form. Appropriate correction is required.

Response to Arguments

6. Applicant's arguments with respect to the rejection of claims 1-7, 13 and 14 under 35 U.S.C. 102(e) as being anticipated by Ruottu et al. (US 6,045,688) have been fully considered but they are not persuasive. On page 11, first paragraph, applicants argue,

> "Applicant has amended the instant application to convert the present application into a Continuation-in-Part of the '688 application. Applicant submits that this is proper as both applications share at least one inventor in common *and were copending for at least one day.*"

However, as indicated above, the applications were not copending for at least one day.

7. Applicant's arguments with respect to the rejection of claims 1, 2, 7 and 13-15 under 35 U.S.C. 102(b) as being anticipated by Squires (US 4,032,305) have been fully considered but they are not persuasive. Beginning on page 11, last paragraph, applicants argue,

> "... the claims have been amended to set forth the positional relationship of the elements used in the instant process. It is now clear that elements of the instant invention are arranged in a different manner from that of Squires. *The Squires apparatus does not define an apparatus of concentric structure.* Thus, the Squires apparatus differs from the present invention both with respect to its construction and, hence its function."

However, the examiner respectfully disagrees and maintains that the apparatus and method of Squires meets the claims. As currently amended, claim 1 (lines 14-15) recites,

> "said regenerator is *concentrically fitted* around said reactor..."

and claim 15 (lines 12-14) recites,

> "the regenerator unit comprises a riser and a dipleg fitted about the reaction unit in a symmetrically *concentric fashion*..."

To one having ordinary skill in the art, the term "concentric" is defined as, "having a common center." Best shown in FIG. 5D, Squires discloses the apparatus comprises a regenerator portion

9 being symmetrically and concentrically fitted about a reactor portion **508**, as both regenerator portion **9** and reactor portion **508** share a common center.

8. Applicant's arguments with respect to the rejection of claims 3-6, 8, 16 and 17 under 35 U.S.C. 103(a) as being unpatentable over Squires (and further in view of secondary references), have been fully considered but they are not persuasive. Beginning on page 12, last paragraph, applicants argue,

> "*Squires simply does not describe a concentric apparatus*. It therefore follows that combining the references in the manner suggested by the Examiner would not result in the apparatus used in the instant process."

Again, as best shown in FIG. 5D, Squires discloses the apparatus comprises a regenerator portion **9** being symmetrically and concentrically fitted about a reactor portion **508**.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

9. Claims 1-7, 13 and 14 are rejected under 35 U.S.C. 102(e) as being anticipated by Ruottu et al. (U.S. 6,045,688).

Regarding claims 1 and 4, Ruottu et al. (FIG. 1; column 8, line 42 to column 10, line 9) discloses a process for thermal conversion of carbonaceous feedstock such as biomass (column

11, lines 52-60), said processing comprising:

feeding the feedstock into a fluidized bed reactor (tubes **1-3**), wherein the feed is converted at an elevated temperature under the influence of particulate matter kept in a fluidized state by a fluidizing gas **8**;

transferring particulate matter from the reactor to a regenerator (inter-tube spaces **24**, **28**, **29**) for regeneration and then recirculating the particulate matter to the reactor after the regeneration; and

recovering the converted hydrocarbon products from the reactor (i.e. via center tube **21**);

wherein, the reactor (tubes **1-3**) comprises a riser **13** having an axially annular cross section equipped with a multi-inlet cyclone (comprising louvered vanes **14**, cyclone chamber **17**) for the separation of particulate matter, and

wherein, the regenerator (inter-tube spaces **24**, **28**, **29**) is concentrically fitted around the reactor and comprises a riser **24** having an axially annular cross section and equipped with a multi-inlet cyclone (comprising louvered vanes **25**, cyclone chamber **26**) for separation of regenerated particulate matter.

Regarding claim 2, Ruottu et al. (FIG. 1; column 8, lines 47-60) disclose an inter-shell riser space **13** formed between the reactor and the regenerator.

Regarding claim 3, Ruottu et al. disclose a vapor residence time of 0.05 - 10 s (claim 3).

Regarding claim 5, Ruottu et al. (FIG. 1; column 9, lines 23-32) discloses the reactor is a circulating fluidized-bed reactor.

Regarding claim 6, Ruottu et al. (FIG. 1; column 9, line 59 to column 10, line 9) discloses the regenerator comprises a channel (i.e. return channel **29**) for internal recirculation.

Regarding claim 7, Ruottu et al. (FIG. 1; column 9, line 59 to column 10, line 9) discloses the regenerator comprises a dipleg (i.e. return channel **29**) communicating with riser **13**.

Regarding claims 13 and 14, "biomass" (column 11, lines 52-60) inherently comprises the instantly recited organic materials.

Instant claims 1-7, 13 and 14 read on the method of Ruottu et al.

10. Claims 1, 2, 7 and 13-15 are rejected under 35 U.S.C. 102(b) as being anticipated by Squires (U.S. 4,032,305).

Regarding claim 1, Squires (FIG. 1, 5B, 5C, 5D; column 25, line 59 to column 28, line 8; column 47, line 32 to column 51, line 46) discloses a process for thermal conversion of carbonaceous feedstock selected from biomass and organic wastes, said process comprising:

feeding the feedstock (introduced via lines **405**; FIG. 5B) into a fluidized bed reactor (comprising zones **708**, **508**), wherein the feed is converted at an elevated temperature under the influence of particulate matter kept in a fluidized state by a fluidizing gas (introduced via multiplicity of pipes **14**);

transferring particulate matter from reactor **708**, **508** to a regenerator (zones **8**, **9**) for regeneration (i.e., by contact with oxygen containing gas, introduced via lines **202**) and then recirculating the particulate matter to the reactor **708**, **508** after the regeneration; and

recovering converted hydrocarbon products from the reactor (via lines **18**, **118**);

wherein, reactor **708**, **508** comprises a riser having an axially annular cross section equipped with a multi-inlet cyclone (i.e., cyclone gas-solid separator **117**, having a multiplicity of outlet openings **416**) for the separation of particulate matter, and

wherein, regenerator **8**, **9** is concentrically fitted around said reactor and comprises a riser having

an axially annular cross section equipped with a multi-inlet cyclone (i.e., cyclone gas-solid separator **17**, having a multiplicity of outlet openings **716**) for separation of regenerated particulate matter.

Regarding claim 2, Squires discloses an intershell riser space (i.e., slow fluidized bed zone **522**; column 50, lines 60-64; FIG. 5B) formed between the reactor **708**, **508** and the regenerator **8**, **9**.

Regarding claim 7, Squires (FIG. 5B; column 50, line 60 to column 51, line 6) discloses regenerator **8**, **9** comprises a dipleg (i.e. the U-tube **21**) which communicates with the riser of reactor **708**, **508**.

Regarding claims 13 and 14, Squires (FIG. 1; column 25, line 59 to column 26, line 43) discloses the feedstock may be selected from a variety of carbonaceous materials, such as wood waste, agricultural wastes, municipal solid waste, sewage sludge, vegetable matter, and the like. Thus, the instantly recited feedstocks are within the scope of the method of Squires.

Regarding claim 15, Squires (FIG. 1, 5B, 5C, 5D; column 25, line 59 to column 28, line 8; column 47, line 32 to column 51, line 46) discloses an apparatus comprising:

a drying unit **4** for drying the feedstock (column 42, lines 55-63);

a reaction unit (comprising zones **708**, **508**) in which the feedstock (introduced via lines **405**) is contacted with heated, fluidized-state particulate matter; and

a regenerator unit (zones **8**, **9**) for regeneration of the particulate matter (i.e. via contact with oxygen containing gas introduced via lines **202**) contaminated in the reaction unit;

wherein, the reaction unit **708**, **508** comprises a riser having an axially annular cross section equipped with a multi-inlet cyclone (i.e. cyclone gas-solid separator **117**, having a

multiplicity of outlet openings **416**) for separating particulate matter from gas, and wherein, the regenerator unit **8**, **9** comprises a riser and a dipleg (i.e. U-tube **21**) fitted about the reaction unit **708**, **508** in a symmetrically concentric fashion, said riser of the regenerator unit **8**, **9** having an axially annular cross section equipped with a multi-inlet cyclone (i.e. cyclone gas-solid separator **17**, having a multiplicity of outlet openings **716**) for separating particulate matter from gas, said dipleg **21** of the regenerator unit **8**, **9** communicating with the riser of the reaction unit **708**, **508** and with the drying unit **4** (see FIG. 5A, wherein line **5** exiting drying unit **4** is the equivalent of line **405**).

Instant claims 1, 2, 7 and 13-15 read on the method and apparatus of Squires.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

11. Claims 3, 5, 6, 16, 17 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Squires (U.S. 4,032,305).

Regarding claim 3, Squires discloses a "fast fluidized condition", wherein "the gas must be supplied at a rate to provide a velocity beyond a critical velocity characteristic of the solid... and the solid must be supplied at a rate beyond that at which the gas flowing at the given velocity is capable of conveying the solid upward in the dilute-phase condition," (column 18, lines 26-33). However, Squires is silent as to a vapor residence time of 0.1 to 5 seconds. In any event, it would have been obvious for one of ordinary skill in the art at the time the invention was made to select an appropriate vapor residence time for the method of Squires, as the specific vapor residence time is not considered to confer patentability to the claim since the precise residence

time would have been considered a result effective variable by one having ordinary skill in the art. Also, the present specification sets forth on page 7, lines 19-23 and page 13, lines 10-13, that the claimed residence time, is at best, a preferred limitation. As such, without more, the claimed time cannot be considered "critical". Accordingly, one having ordinary skill in the art would have routinely optimized the vapour residence time in the system to obtain the desired gas/solid velocity. *In re Boesch*, 617 F.2d. 272, 205 USPQ 215 (CCPA 1980), and since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Regarding claim 5, Squires (FIG. 5B; column 51, lines 6-10) discloses fluidized-bed reactor **708**, **508** having a channel (i.e. U-tube **721**) for the circulation of material **722**.

Regarding claims 6 and 16, Squires (FIG. 5B; column 50, line 60 to column 51, line 6) discloses regenerator **8**, **9** comprises a channel (i.e. U-tube **21**) for recirculation of solid matter **22** to the regenerator. Although the channel is not internally located, it would have been an obvious design choice for one of ordinary skill in the art at the time the invention was made to select an internally located channel to enable "internal recirculation" of the material, since such configurations are known in the art (FIG. 5H; internal channels **921**, **1021**).

Regarding claims 17 and 21, Squires (FIG. 5B; column 51, lines 6-10) discloses reaction unit **708**, **508** comprises a channel (i.e. U-tube **721**) for recirculation of particulate matter **722** within the reactor. Although the channel is not internally located, it would have been an obvious design choice for one of ordinary skill in the art at the time the invention was made to select an internally located channel for "internal recirculation" of the matter in the method of Squires, since such configurations are known in the art (see FIG. 5H, internal channels **921**, **1021**).

12. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Squires (U.S. 4,032,305) in view of Munday (U.S. 2,515,155).

Although Squires is silent as to the multi-inlet cyclone comprising louvered vanes, it would have been an obvious design choice for one of ordinary skill in the art at the time the invention was made to provide louvered vanes to the cyclone in the method of Squires, on the basis of suitability for the intended use, since the use of louvered vanes in the separation of solids from gases is conventionally known in the art, as evidenced by Munday (i.e., cyclone separator comprising louvered vanes **14**; FIG. 2; column 2, lines 31-34).

13. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Squires (U.S. 4,032,305) in view of Ogorzaly et al. (U.S. 2,689,787).

Squires discloses drying the feedstock in a drier **4** prior to introduction to the reactor (column 42, lines 55-63). However, Squires is silent as to the specific structure of the drier, such as whether the drier may comprise a riser having an axially annular cross section, equipped with a multi-inlet cyclone. In any event, it would have been an obvious design choice for one of ordinary skill in the art at the time the invention was made to select such a drier in the method of Squires, on the basis of suitability for the intended use, since such driers are known in the art, as evidenced by Ogorzaly et al. As illustrated in FIG. 1, Ogorzaly et al. teach a drier comprising a shaft **10** of annular cross-section and having a cyclone or separator **40** having multiple inlets **37**.

Allowable Subject Matter

14. Claims 9-12 and 18-20 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

15. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a). A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

* * *

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer A. Leung whose telephone number is (571) 272-1449. The examiner can normally be reached on 8:30 am - 5:30 pm M-F, every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn A. Caldarola can be reached on (571) 272-1444. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

Jennifer A. Leung
January 23, 2004

Hien Tran

HIEN TRAN
PRIMARY EXAMINER